



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

Name of the Student : Sachin Shivaji Jadhav

Roll Number : 166105001

Programme of Study : Ph.D.

Thesis Title:

Strategic Selection and Integrative Perspective of Design Methods in Developing a Service System Design Framework with Special Reference to Domestic Plumbing

Name of Thesis Supervisor(s) : Dr. Pratul Ch. Kalita

Thesis Submitted to the Department/ Center : Design

Date of completion of Thesis Viva-Voce Exam : 11-04-2022

Key words for description of Thesis Work : **Product-Service System, Service System Design, E-commerce, Home Services, Domestic Plumbing, Design Management, Design Methods**

SHORT ABSTRACT

The prime inspiration of this research is to formulate a framework for strategic selection and integration of design methods for service development process in Product Service Systems (PSS) perspective. This research maps Design Thinking in PSS service development process. The effort has been experimented and successfully demonstrated with a case study of online domestic plumbing services in Indian context.

In recent years, the integration of products and services is a significant and growing trend. This phenomenon is due to the advancement of technology, information and competitive business environments. The potential of integrating products and services lies in improved efficiency, benefits customers and product and service providers. The studies related to this area are described mainly from the perspective of Design Management approach in Product Service System (PSS). The Product Service System (PSS) concept focuses on selling functional results instead of the conventional sale of products. A unified approach for developing and delivering an integrated product-service offering is scarce. Researchers focused on integrating products and services as a significant objective. In addition, the proposed integration processes of products and services are numerous, but the detailed steps within each stage are missing. On the other hand, organizations and enterprises have lagged in understanding, knowledge and developing PSS business models. Moreover, PSS business models have been developing for business-to-business (B2B) sectors; but in the context of business-to-consumer (B2C) sectors it is often overlooked. The overall objective of our research is to propose a PSS design framework with integration of design methods aligning strategic design management. This thesis focuses on the Product Service System (PSS), which is the core research area. A service system design framework has been proposed, to which this thesis aims to contribute. It comprises three main phases. These are viz. PSS requirements identification and analysis, PSS designing and detailing and PSS test and implementation. A case example of domestic plumbing services in the Indian context demonstrates the proposed service system design framework. The PSS requirements identification and analysis phase involved activities viz. identification and analyses of customer requirements, design requirements prioritization, and plausible scenarios for domestic plumbing. The Design brief provides a structured statement that outlines problem definition, goals,

constraints, budgets, and timeline. Hence this approach was employed in defining the problem structure for domestic plumbing services. The PSS design and detailing phase emphasized the design thinking approach in developing an e-commerce business. It illustrated the application of design thinking through stakeholder mapping, service blueprint, data flow and wireframe techniques in developing e-commerce with the practical case of domestic plumbing services. The PSS test and implementation phase concentrated on the market launch of the domestic plumbing service system. It included benchmark study, B2C e-commerce business model development and SWOT analysis. It comprised website design and development and validated through the customers and expert users.

This thesis offers two main contributions in line with research and design viz.: (1) Service system design framework from PSS perspective inspired by design management. (2) service and system design for the domestic plumbing sector in the Indian context. This research provides knowledge to support designers working in the field of product service system design in e-commerce. Current research methodology, design methods and findings provide insights on how a service system design works for an e-commerce business model. It presents recommendations on how to build a service system design in this context. The research presented in this thesis was conducted in India and considered only domestic plumbing as a case example. Therefore, the proposed service system design framework, developed e-commerce business model and strategies could have cultural and demographic influences. The future research trajectories may include more case studies of home services to generalize the proposed service system design framework.

